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Synchronized Intermittent Mandatory Ventilation (SIMV)

- SIMV is a mode in which the ventilator delivers control breaths to patients at or near the time of a spontaneous breath. The mandatory breaths are synchronized with the patient's spontaneous breathing efforts so as to avoid breath stacking.

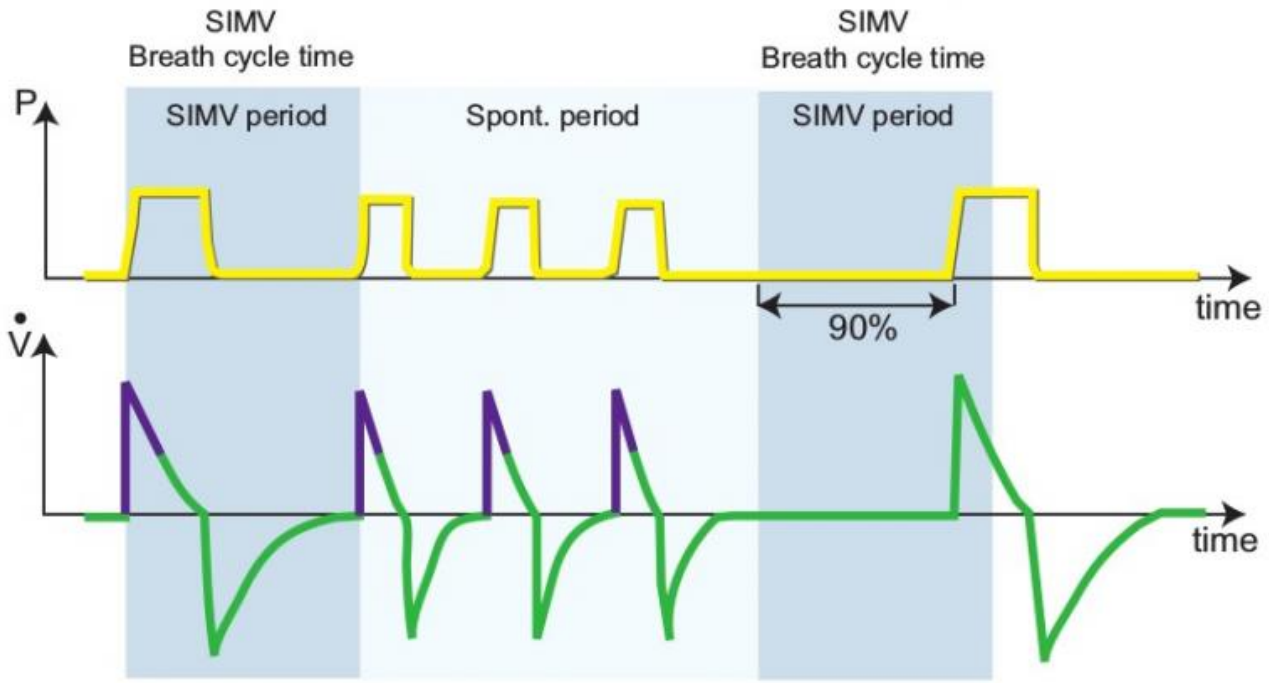
- The SIMV mandatory breaths may be either time triggered or patient triggered.

Mandatory Breaths

- In SIMV mode, when spontaneous breaths are absent the ventilator triggers breath based on the RR set.
- But when the patient is breathing spontaneously, and if random chance the patient begins to inspire just prior to point at which ventilator would be expected to trigger (Synchronization window) then the ventilator senses this effort and delivers the mandatory breath as an assisted patient triggered breath.

Spontaneous Breaths

- In between the mandatory breaths the SIMV also permits spontaneous breaths to any tidal volume. Here the spontaneous breaths are truly spontaneous.
- The spontaneous/pressure supported breath is defined by setting the PS above PEEP and cycle off.



If the patient is not breathing at all only the mandatory breaths will be delivered. When the patient starts to breathe he will get the Pressure Support in the spontaneous period and if triggering in the SIMV period the set mandatory breath will be delivered. In the next SIMV period the ventilator will wait for the patient to trigger but if the patient has not triggered within the first 90% of the breath cycle time (SIMV period) a mandatory breath will be delivered.

- Advantages
    - SIMV helps to maintain respiratory muscle strength, because respiratory muscles are used during spontaneous breath in SIMV Mode.
    - Reduces ventilation to perfusion mismatch

- SIMV mode tends to decrease mean airway pressure, as it allows spontaneous breath which have a low peak inspiratory pressure.
- SIMV mode facilitates weaning because gradual decrease in respiratory rate is possible.

Different SIMV Modes

- SIMV Volume Control and Pressure Support
- SIMV Pressure Control and Pressure Support
- SIMV PRVC and Pressure Support

Settings

SIMV VC + PS	SIMV- PC+PS
• TV • PEEP • FiO_2 • RR • I: E Ratio • Pressure support for spontaneous breaths	• PC • PEEP • FiO_2 • RR • I: E Ratio • Pressure support for spontaneous breaths

Updated on 20/9/2015

Reference

- Clinical Application of Mechanical Ventilation. David W. Chang
- Patient Centered Acute Care (PACT) . Mechanical Ventilation 2011.

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